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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,395	02/23/2004	Walter D. Mieher	KLA1P117X1B/P1151/2	6514

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EXAMINER
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STOCK JR, GORDON J

ART UNIT	PAPER NUMBER
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2877

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/08/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/785,395

Applicant(s)

MIEHER ET AL.

Examiner

Gordon J. Stock

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-10 and 12-14 is/are rejected.
- 7) ☒ Claim(s) 5 and 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 December 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 20061206.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. The Amendment received on December 6, 2006 has been entered into the record.

#### *Information Disclosure Statement*

2. The information disclosure statement (IDS) submitted on December 6, 2006 is being considered by the examiner.

#### *Drawings*

3. The Drawings filed on December 6, 2006 is accepted by the Examiner.

#### *Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1-3, 12 and 13** are rejected under 35 U.S.C. 102(e) as being anticipated by **Yang et al. (6,982,793)—cited by applicant.**

As for **claims 1, 12, and 13**, Yang in a method and apparatus for using an alignment target with designed in offset discloses the following: providing a plurality of periodic targets A, B, C, D that each include a portion of the first and second structures on a first and second layer of a sample (Fig. 15: 252, 254, 256, 258); wherein the target A (Fig. 15: 252) is designed to have a predefined offset, D, between its first and second structures portions (Fig. 15: 252, D); wherein the target B (Fig. 15: 254) is designed to have a predefined offset, -D, between its first and second structures portions (Fig. 15: 254, -D); wherein the target C (Fig. 15: 256) is designed to

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have a predefined offset,  $D + d$ , between its first and second structures portions (Fig. 15: 256,  $D + d$ ); wherein the target  $D$ , (Fig. 15: 258) is designed to have a predefined offset,  $-D-d$ , between its first and second structures portions (Fig. 15: 258,  $-D-d$ ); determining any overlay error between the first structures and the second structures using linear approximation based on obtained spectra (Fig. 16: equation 8; col. 16, lines 40-50); a scatterometry module for illuminating the targets thereby a scatterometry overlay technique is used (Fig. 12c: 145; col. 11, lines 50-55; col. 12, lines 20-35); suggests storing the overlay error in memory (col. 12, lines 21-31; col. 14, lines 50-65); he demonstrates at least two optical signals (Figs. 26a and 27a: 802a, 802b; and suggested by plurality of angles with Fig. 12c; plurality of signals from plurality of targets: Fig. 35: 1502, 1504). In addition, he discloses that the overlay targets may be two dimensional structures, wherein, each first structure has a first center of symmetry and each second structure has a second center of symmetry; wherein, the first center of symmetry and the second center of symmetry for each target are offset with respect to each other by a selected one of the predefined offsets (Fig. 24: 700, 702, 704). And suggests using a center of symmetry for overlay determination by using the centerline of the patterns (col. 19, lines 20-30). And Yang discloses that overlay may be determined without a calibration operation, without comparing the measured optical signals to calibration data, or a model-based regression technique, by using a reference offset instead of a modeling process (col. 6, lines 48-54).

As for **claims 2-3**, Yang discloses everything as above (see **claim 1**). In addition, he discloses that a plurality of measured optical signals for each target may be obtained simultaneously and obtained simultaneously by a simultaneous multiple angle of incidence ellipsometer (Fig. 26b and col. 12, lines 35-60).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Yang et al. (6,982,793)**—cited by applicant.

As for **claim 4**, Yang discloses everything as above (see **claim 3**). He does not explicitly state that the ellipsometer of Fig. 12b has a plurality of detector elements arranged to detect one of a plurality of measured optical signals for each target. However, Yang does teach a plurality of detector elements in the device of Fig. 26a (816). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the detector comprise a two-dimensional array detector in order to measure the targets at a plurality of wavelengths and/or angles.

8. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Yang et al. (6,982,793)**—cited by applicant further in view of **Chu (6,919,964)**.

As for **claim 7**, Yang discloses everything as above (see **claim 2**). In addition, he discloses the plurality of measured optical signals for each target obtained simultaneously with an ellipsometer/reflectometer (Fig. 26b and col. 12, lines 35-60). Yang is silent concerning using a beam profile reflectometer. However, Chu in a CD metrology analysis method teaches that beam profile reflectometry may be used for overlay measurement as a scatterometry technique (col. 1, lines 15-35). Therefore, it would be obvious to one of ordinary skill in the art at the time

the invention was made to obtain signals by a beam profile reflectometer in order to determine overlay using a scatterometry technique.

9. **Claims 8-10** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Yang et al. (6,982,793)**—cited by applicant in view of **Sezginer et al. (7,042,569)**—cited by applicant and **Waldo, III (5,355,306)**.

As for **claims 8-10**, Yang discloses everything as above (see **claim 2**). In addition, he discloses the plurality of measured optical signals for each target obtained simultaneously with an ellipsometer/reflectometer (Fig. 26b and col. 12, lines 35-60). Yang is silent concerning using an optical fourier transform reflectometer/ellipsometer/polarized reflectometer. However, Sezginer teaches that Fourier component analysis using a polarized reflectometer, an ellipsometer, may be used for overlay error measurement (col. 10, lines 25-30) and Waldo in an alignment system teaches that overlay may be measured using Fourier component analysis or Fourier transformation (col. 4, lines 1-10). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to use an optical polarized reflectometer, an optical ellipsometer using Fourier transform an art recognized functional equivalent of Fourier component analysis in order to determine overlay of the targets.

10. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Yang et al. (6,982,793)**—cited by applicant in view of **Niu et al. (6,699,624)**—previously cited.

As for **claim 14**, Yang discloses everything as above (see **claim 1**). He does not explicitly state a phase based technique; he does disclose ellipsometry (col. 12, lines 35-60). However, Niu in an overlay metrology method teaches using phase in ellipsometry (col. 4, lines 65-67). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention

was made to use a phase-based technique such as ellipsometry in order to measure the profile of the gratings for overlay calculation.

*Allowable Subject Matter*

11. **Claims 5-6** would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and rewritten to overcome the rejection under 35 U.S.C. 101 stated above.

As to **claim 5**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a method of determining an overlay error determining a second overlay error by comparing the measured optical signals to theoretical data, in combination with the rest of the limitations of **claims 5-6**.

*Response to Arguments*

12. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Fax/Telephone Numbers***

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

*Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (571) 273-8300*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431.

The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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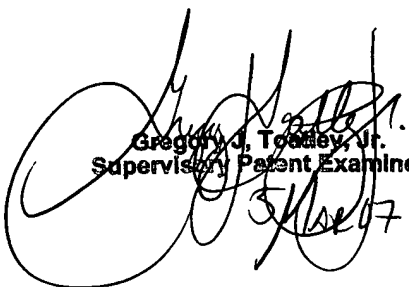
system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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February 27, 2007

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Art Unit 2877

  
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5/11/07